United Nations ST/SG/AC.10/C.3/2014/15

Secretariat

Distr.: General
24 March 2014

Original: English

Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

Sub-Committee of Experts on the Transport of Dangerous Goods

Forty-fifth session
Geneva, 23 June – 2 July 2014
Item 6 (b) of the provisional agenda
Transport of gases: miscellaneous

Material requirements regarding elongation for non-refillable cylinders

Transmitted by the expert from Germany[1]

Background

1. The material properties of metallic cylinders are determined by their chemical composition and the heat treatment applied – if any.

2. For refillable cylinders the control of material properties is achieved by the tensile test which determines yield stress, tensile strength and elongation. Therefore these test results are crucial for the conformity assessment and by thus an indispensable part of all ISO standards for refillable cylinders. The standards for refillable cylinders define a certain minimum requirement regarding elongation which is 14 % for receptacles made from steel and 12 % for receptacles made from aluminium or aluminium alloys.

3. The materials section of the standard for non-refillable cylinders (ISO 11118:1999) refers to the standards for refillable cylinders, e.g. ISO 11118:1999, 5.2.1. "Carbon and low-alloy steels" refers to ISO 9809-1 (and other standards).

4. However, it is not common sense that this reference also includes the requirement regarding elongation. Thus, even very brittle materials may be accepted for non-refillable cylinders as long as these do not appear brittle in the burst test.

[1] In accordance with the programme of work of the Sub-Committee for 2013-2014 approved by the Committee at its sixth session (refer to ST/SG/AC.10/C.3/84, para. 86 and ST/SG/AC.10/40, para. 14).

5. Taking into account safety issues for these non-refillable cylinders which are put on the market in a very high number it is suggested to include minimum requirements in the regulation itself. As there are no load cycles to be borne by the non-refillable cylinders the requirements can be reduced to about 2/3 of the required values for refillable cylinders. This consideration led to the proposed values of 9 % for steel, 8 % for aluminium alloys and 6 % for aluminium. With regard to the importance of the elongation and the clarity of the provisions the requirement for refillable cylinders should be included in the regulation, too.

6. In order to include these requirements it is suggested to amend 6.2.1.2.2 where already a general requirement regarding brittle fracture is included.

Proposal

7. Add to the end of 6.2.1.2.2:

> For refillable receptacles the minimum elongation at fracture shall be 14 % for steel and 12 % for aluminium or aluminium alloys. For non-refillable cylinders the minimum elongation at fracture shall be 9% for steel, 8% for aluminium alloys and 6% for aluminium.